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(54) **Metalwork of a window and elements thereof**

(57) Metalwork of a window with a fixed frame (2) and a leaf (3) as well as a control of the metalwork to open and close the leaf (3) which can turn round a vertical axis (X-X') or which can tilt round a horizontal axis (Y-Y') depending on the position of the control (15), whereby a scissor mechanism (29) is provided with a main arm (30) which can freely rotate in relation to the leaf (3) in order to make the window (1) tilt and which can be locked in relation to the leaf (3) in order to make the window (1) turn by means of a locking device with two coupling elements, a coupling element (38) is provided on the leaf (3) on a slide lath (28) which can shift over an outer perimeter (8) of the leaf (3) by means of the control (15) and a coupling element (37) on the main arm (30) is made as a rotating arm (39) on which has been provided an eccentric gudgeon (37) which can work in conjunction with a complementary female coupling element (38) on the slide lath (28), which arm (39) has been provided on the main arm (30) in such a way that it can turn half a turn between two positions that can be locked, corresponding to a turn tilt or a tilt turn type of metalwork (6) respectively.

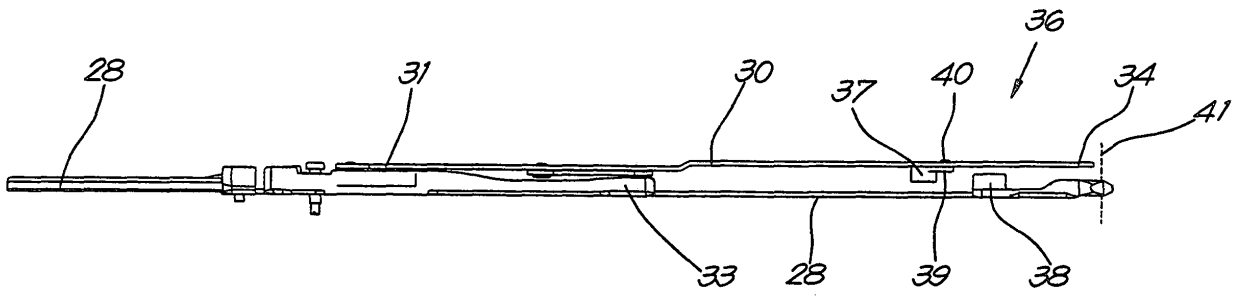

Fig. 12 A

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Description

[0001] The present invention concerns a metalwork of a window and the elements thereof.

[0002] In particular, the invention aims the metalwork of a window with a fixed frame and a leaf as well as a control of the metalwork to open and close the leaf which can turn round a vertical axis or which can tilt round a horizontal axis, depending of the position of the control.

[0003] The control of such metalwork is usually provided with a control crank that can be put in three positions, namely a closing position to close and lock the window in a closed position; a first opening position, turned a quarter of a turn so as to open the window from the closed position around a vertical hinge pin, and a second opening position, turned a quarter of a turn further so as to tilt the window open as of the closed position around a horizontal hinge pin.

[0004] This type of metalwork is called turn tilt metalwork.

[0005] The tilt turn type of metalwork, whereby the control of the window can tilt in the first opening position, whereas the window can turn in the second opening position, as opposed to with the turn tilt type of metalwork whereby it is just the other way round.

[0006] A disadvantage is that both types of metalwork are different and that, consequently, the desired type must be chosen at the time of purchase of the window or metalwork.

[0007] If one wishes to switch from a turn tilt type of metalwork to a tilt turn type of metalwork, one will be forced to replace the metalwork as a whole or practically entirely.

[0008] Such a transformation is relatively expensive because of the cost price of new metalwork and the labour costs of a craftsman to carry out the transformation.

[0009] From WO 01/94729 is known a type of metalwork for a window with a fixed frame and a leaf as well as a control for the metalwork to open and close the leaf which can turn round a vertical axis or which can tilt round a horizontal axis, depending on the position of the control which can move from a closing position in which the window is closed to a first opening position for one of either movements of the wing, i.e. turning for a turn tilt type of window or tilting for a tilt turn type of window, and further on to a second opening position for the other movement, i.e. tilting for a turn tilt type of window or turning for a tilt turn type of window, and whereby a scissor mechanism is provided with a main arm which can freely rotate in relation to the leaf so as to make the window tilt and which can be locked in relation to the leaf by means of a locking device with two coupling elements so as to make the window turn, i.e. a coupling element on the main arm and a coupling element on the leaf which can mesh by means of the control of the metalwork so as to lock the main arm or which can be moved apart in view of the free movement of the main arm, whereby at least one of both coupling elements is made as an adjustable part which makes it possible to transform the scissor-type part of the metalwork from a turn tilt type to a tilt turn type, and vice versa, by means of a mutual readjustment.

[0010] In this way, by simply readjusting some elements of the metalwork's scissor-type part, one can switch from one type of metalwork to another type of metalwork without having to buy any new metalwork or elements thereof, and one can switch between both types of metalwork at any time without having to mount or dismount the metalwork as a whole.

[0011] A disadvantage, however, is that the adjustable part is relatively complex and that, in order to change the type of metalwork, it must each time be removed and turned.

[0012] The present invention aims to remedy one or several of the above-mentioned disadvantages.

[0013] To this aim, the invention concerns a metalwork of the above-mentioned type whereby the coupling element is provided on the leaf on a slide lath which can slide, by means of the control, over an outer perimeter of the leaf, and whereby the coupling element on the main arm is designed as a rotating arm on which is provided an eccentric gudgeon which can work in conjunction with a complementary female coupling element on the slide lath, which arm can rotate half a turn on the main arm between two positions that can be locked, corresponding to a turn tilt or a tilt turn type of metalwork respectively.

[0014] An advantage is that the transformation can be carried out quickly and easily by anyone whatsoever, and that it is not absolutely necessary to call in a craftsman, which implies that no costs will have to be paid to a craftsman either.

[0015] The metalwork is preferably such that the entire transformation from one type of metalwork to the other type of metalwork can be obtained by readjusting two elements at the most, preferably including the above-mentioned rotating arm with the eccentric gudgeon, as a result of which the transformation can be done very quickly.

[0016] As is known, the above-mentioned control of the metalwork is usually composed of one or several slide laths which can slide over the outer perimeter of the leaf in a groove of the metalwork running in the outer perimeter of the leaf, whereby an angle drive is applied in one or several corners of the leaf of the window, formed of a hooked guide in which slides an elastic, flexible lath, which lath is coupled to the above-mentioned slide laths at its far ends, on the edges on either side of the angle drive.

[0017] A disadvantage of such a known angle drive is that the coupling with the above-mentioned slide laths may be rather time-consuming and preferably requires the intervention of a craftsman.

[0018] According to a special aspect of the invention, the flexible lath of the angle drive is provided with a coupling piece in the shape of a snap-in system at its far ends to connect other of the above-mentioned slide laths

or other elements of the metalwork to.

[0019] In this way, the mounting and dismounting of the metalwork is very easy and thus feasible for a non-craftsman.

[0020] According to a preferred embodiment, the coupling piece is formed of a holder which is fixed under the flexible lath at a far end concerned and in which a body has been provided which is pushed in the direction of the lath by means of a spring and on which has been provided a protrusion extending through a passage in the flexible lath and which protrudes over a certain length from the top of the latter when in rest, whereby said protrusion has been designed to work in conjunction with a passage or a recess of a part of the metalwork to be coupled.

[0021] In order to better explain the characteristics of the invention, the following preferred embodiment of the metalwork for a window according to the invention and the elements thereof are described by way of example only without being limitative in any way, with reference to the accompanying drawings, in which:

figure 1 shows a view in perspective of a window that is turned open, whereby said window is provided with metalwork to open and close the window;
figure 2 schematically shows the metalwork for a window according to the invention, seen in perspective and whereby most of the elements are disassembled;
figure 3 shows a section of the angle drive indicated by F3 in figure 2 to a larger scale;
figure 4 shows a front view of the elements of the metalwork in the lower left corner, indicated by F4, represented in an operational configuration;
figure 5 shows a view as in figure 4, but for another position;
figures 6 and 7 show a front view and a top view respectively of the part which is indicated with F6 in figure 2;
figure 8 shows a view as in figure 7, but for another position;
figures 9A and 9B show respective views analogous to those of figures 6 and 4, for the metalwork of figure 2 in a turn tilt configuration, and such for the closing position of the window;
figures 10A and 10B, 11A and 11B respectively, show the same views as in figures 9A and 9B, but for a turning position, tilting position respectively of the window;
figures 12A and 12B respectively show the same views as in figures 9A and 9B, but for the metalwork of figure 2 in a tilt turn configuration and for the closing position of the window;
figures 13A and 13B, 14A and 14B respectively, show the same views as in figures 12A and 12B, but for a tilting position, a turning position of the window respectively;
figure 15 shows the coupling between the angle drive of figure 3 and other elements of the metalwork.

[0022] The window 1 of figure 1 is, as is known, composed of a fixed frame 2 and a leaf 3 with which the window can be opened.

[0023] The frame and the leaf are usually composed of posts 4, 5 respectively.

[0024] In order to open and close the window 1, a metalwork 6 is provided, whose preferred embodiment according to the invention is represented in figure 2 with elements of which a number are mounted in a sliding manner in a groove 7 of the metalwork running over the outer perimeter 8 of the leaf 3 and which is formed of two standing ribs 9 of the posts 4 placed at a distance from one another and whose free edges are bent towards each other.

[0025] The metalwork comprises two hinges 11 which make it possible for the leaf 3 to turn open round the axis X-X'.

[0026] The lower hinge 11 is a double-acting hinge which enables a rotation round the axis X-X' as well as a tilting round the axis Y-Y'.

[0027] In order to make the leaf 3 tilt, the lower hinge 11 works in conjunction with a detachable hinge with two hinge parts that can be disconnected, namely a hinge pin 13 on the leaf 3 and a U-shaped element 4 on the frame 2 respectively, in which the hinge pin 13 can be pushed in view of a hinged co-operation between the parts 13 and 14, as represented in figures 4 and 5.

[0028] Further, the metalwork 6 mainly comprises a number of elements, namely a control crank 15 mounted on a base 16 which is fixed to a standing edge of the leaf 3 and in which a catch piece 17 can slide up and down by means of an internal mechanism, not represented, which is set in motion by turning the control crank 15.

[0029] In the groove in the metalwork 7 of the above-mentioned standing edge of the wing 3, slide laths 18 are provided above and under the catch piece 17 which are coupled to the catch piece 13.

[0030] The lower slide lath 18 is coupled with its lower end to an angle drive 20, as represented in more detail in figure 3, and which can transfer the up-and-down movement of the lower slide lath 18 to a slide lath 21 which can shift to and fro horizontally in the groove in the metalwork 7 of the lower post 4 of the leaf 3, whereby said slide lath 21 is provided with closing gudgeons 22 which, in a closed position of the leaf 3, thanks to a shift of the slide lath 21, can mesh with closing points 23 so as to lock the window in its closed position.

[0031] The hinge pin 13 is in this case coupled to the angle drive 20 and/or to the slide lath 21, whereby a shift makes sure that the hinge pin 13 can be coupled to or disconnected from the U-shaped element 14 which is in this case formed of a U-shaped post with standing legs 24 which are interrupted over a certain length in a central part by a recess 25 which is wide enough to turn the hinge pin 13 crosswise away from the U-shaped post 14 at the leaf.

[0032] The hinge pin 13 is in this case part of a locking pin 26 provided on the angle drive 20 and which can shift

over the perimeter of the leaf 3 so as to mesh in a recess 27 or a cavity in the frame 2 in order to lock the leaf 3 in a closed position of the window 1.

[0033] The upper slide lath 18 is coupled with its top end to a second angle drive 16 which activates an additional locking pin 26 and which can transfer the up-and-down movement of the upper slide lath 18 onto a slide lath 28 which can shift to and fro horizontally in the groove in the metalwork 7 of the upper post 4 of the leaf 3.

[0034] The slide lath 28 continues under a scissor mechanism 29, which scissor mechanism is designed such that it can restrict the tilting movement of the leaf 3.

[0035] The scissor mechanism 29 is represented in more detail in figures 6 to 8 and it mainly consists of a main arm 30 which is hinge-mounted to a carriage 32 with one far end 31 which can shift in the longitudinal direction of the upper post 4 in a guide 33 which is fixed to this post 4 and where the slide lath 28 runs under.

[0036] The other far end 34 of the main arm 30 is connected in the known manner to the upper hinge 11 and it is connected via a hinge arm 35 to the guide 33.

[0037] The scissor mechanism 29 is further provided with a locking device 36 which can lock the rotation of the main arm 30 in relation to the leaf 3 or of the slide lath 28 fixed to the latter.

[0038] Said locking device 36 in this case consists of two coupling elements, a coupling element 37 in the shape of a gudgeon on the main arm 30 and a complementary female coupling element 38 on the slide lath 28 respectively, whereby the coupling element 37 on the main arm 30 can be adjusted in the longitudinal direction of the main arm 30 between two fixed positions corresponding to a position for a turn tilt metalwork, as shown in figures 9 to 11, and a position for a tilt turn metalwork, as shown in figures 12 to 14, respectively.

[0039] In the given example, the gudgeon 37 can be adjusted between the above-mentioned fixed positions as the gudgeon 37 is provided eccentrically on an arm 39 which can turn half a turn around an axis 40 and which can be fixed in one or other position, for example by means of a non-represented screw. It is clear that the gudgeon 37 can also be adjusted in other ways.

[0040] The working of the device 1 is very simple and as follows.

[0041] In order to realise a turn tilt metalwork, the U-shaped element 14 and the coupling element 37 are put in a position as shown in figure 9A and 9B representing the situation in which the window 1 is closed and the leaf 3 is locked in relation to the frame 2, whereby the locking pins 26 mesh in the frame 2 whose inner edge 41 is represented by means of a dashed line.

[0042] This situation corresponds for example to a downward directed closing position of the control crank 15.

[0043] When the crank 15 is turned for example a quarter of a turn as of this position to a first opening position, the slide laths 18 will be pushed down and the slide lath 28 is moved to the left, as a result of which the locking pins 26 are withdrawn from the recesses 27 in the frame 2.

[0044] The scissor mechanism 29 is simultaneously locked, as shown in figure 10A, while the hinge pin 13 is withdrawn from the hinge part 14 up to opposite the recesses 25 in the U-shaped hinge part, as shown in figure 10B, as a result of which the window can be turned open around the vertical axis X-X' while the window is prevented from tilting round the axis Y-Y'.

[0045] When the crank 15 is turned a quarter of a turn further into a second opening position, the scissor mechanism 29 will be unlocked, as shown in figure 11A, and the hinge pin 13 will be simultaneously pushed in the hinge part 14 so as to co-operate in a hinged manner.

[0046] It is clear that, in this way, the leaf 3 can be tilted open as of the closed position of the window 1 round the horizontal axis Y-Y', while the window 1 is prevented from turning round the axis X-X'.

[0047] In order to make a tilt turn window out of the turn tilt window, one only has to rotate the coupling element 37 into a position whereby the gudgeon 37 is moved to the left, as shown in figure 12A, and to move the hinge part 14 to the right into a position as shown in figure 12B.

[0048] These figures 12A and 12B correspond to a position of the crank 15 corresponding to the above-mentioned closing position of the crank 15.

[0049] When the crank 15 is turned into the first opening position as of this position, the scissor mechanism will be unlocked, as shown in figures 13A and 13B, and the hinge parts 13 and 14 will be hinged, such that the window can tilt.

[0050] If the crank is turned even further then up to the second opening position, the scissor mechanism 28 will be locked and the hinge 12 will be disconnected, such that the window can be turned open.

[0051] It is clear that is very simple to switch from a turn tilt to a tilt turn type of metalwork by simply moving or adjusting the elements 14 and 37.

[0052] It is also clear that the same result could be obtained by moving the elements 13 and 38 co-operating with the latter or by mutually moving the co-operating elements.

[0053] According to a special aspect of the invention, an angle drive 20 is applied as represented in detail in figure 3 which is formed of a hooked guide 42 with a guide chute 42A in which an elastic flexible lath 43 can shift, which lath 43 is provided with a coupling piece 44 in the shape of a springy snap-in system at its far ends to connect the other above-mentioned slide laths 18,21,28 or other elements of the metalwork 6 to.

[0054] The coupling piece 44 of figure 3 is formed of a holder 45 which is fixed at a far end concerned of the flexible lath 43 under said lath 43, in this case by means of hooks 46 that spring back.

[0055] The holder 45 is provided with a space 47 that is confined by a bottom 48 in which has been provided a body 49 which is pushed between the body 49 and the bottom 48 in the direction of the lath 44 by means of a

spring 50 and on which are provided two buttons or protrusions 51 in this case, extending through passages in the flexible lath 43 and protruding over a certain length from the top of the latter when in rest.

[0056] These protrusions 51 are designed to work in conjunction with complementary passages or recesses 52 of a part of the metalwork 6 to be coupled, as shown in figure 15.

[0057] The two protrusions 51 are situated at a distance from one another, which makes it possible to simultaneously connect two elements to one and the same end of the flexible lath 43 of the angle drive 20 if necessary, as shown for example in figure 15, where a slide lath 18 and a locking pin 26 are connected to one single coupling piece 44.

[0058] Naturally, the coupling piece 44 may be provided with only one protrusion 51 or the coupling piece 44 can be designed with two protrusions which are each independently spring-mounted.

[0059] Thanks to this system of coupling pieces 44, the metalwork can be very easily mounted. To this end, an angle drive 20 is mounted first for example, after which the lath 28 is pushed in the groove in the metalwork 7 of the upper post 4, for example up to the corner piece 20 and over a protrusion 51 which is simultaneously being pushed in against the force of the spring 50.

[0060] When the recess 52 at the far end of the slide lath 28 comes over the protrusion 51, said protrusion 51 will snap in the recess 52, thus guaranteeing a connection between the slide lath 28 and the flexible lath 43 of the corner piece 20.

[0061] According to yet another aspect of the invention, the control 15 may be provided with a locking mechanism which has been integrated for example in the base 16 and which prevents the control crank 15 from being turned further into the second opening position.

[0062] Thus, a window which can only turn open is obtained for a turn tilt type of metalwork, and a window which can only tilt is obtained for a tilt turn type of metalwork.

[0063] The present invention is by no means restricted to the embodiment described by way of example and represented in the accompanying drawings; on the contrary, such a metalwork according to the invention and the accompanying elements can be made in all sorts of shapes and dimensions while still remaining within the scope of the invention.

Claims

1. Metalwork of a window with a fixed frame (2) and a leaf (3) as well as a control of the metalwork to open and close the leaf (3) which can turn round a vertical axis (X-X') or which can tilt round a horizontal axis (Y-Y') depending on the position of the control (15) which can be moved from a closing position in which the window (1) is closed, to a first opening position for one of either movements of the leaf (3), i.e. turning for a turn tilt type of window (1) or tilting for a tilt turn type of window (1), and further on into a second opening position for the other movement, i.e. tilting for a turn tilt type of window (1) or turning for a tilt turn type of window (1), whereby a scissor mechanism (29) is provided with a main arm (30) which can freely rotate in relation to the leaf (3) in order to make the window (1) tilt and which can be locked in relation to the leaf (3) in order to make the window (1) turn by means of a locking device with two coupling elements, a coupling element (37) on the main arm (30) and a coupling element (38) on the leaf (3) respectively, which can mesh in order to lock the main arm (30) by controlling the metalwork (1) or which can be moved apart in view of the free movement of the main arm (30), whereby either one of both coupling elements or both coupling elements (37-38) are made as an adjustable part which makes it possible, via mutual adjustment, to transform the scissor-type part of the metalwork (1) from a turn tilt type into a tilt turn type, **characterised in that** the coupling element (38) is provided on the leaf (3) on a slide lath (28) which can shift over an outer perimeter (8) of the leaf (3) by means of the control (15) and **in that** the coupling element (37) on the main arm (30) is made as a rotating arm (39) on which has been provided an eccentric gudgeon (37) which can work in conjunction with a complementary female coupling element (38) on the slide lath (28), which arm (39) has been provided on the main arm (30) in such a way that it can turn half a turn between two positions that can be locked, corresponding to a turn tilt or a tilt turn type of metalwork (6) respectively.

2. Metalwork according to claim 1, **characterised in that** the transformation from one type of metalwork (6) into another type of metalwork (6) is made possible by adjusting two elements at the most.

3. Metalwork according to claim 1 or 2, **characterised in that** it is provided with a detachable hinge (12) for tilting the window (1) with two disconnectable hinge parts, a hinge part (14) on the fixed frame (2) and a hinge part (13) on the leaf (3) respectively, which can be pushed in or out of one another by means of the control (15) of the metalwork (6), in order to tilt the window (1) and in order to turn the window (1) respectively, whereby one of both hinge parts (13-14) or both hinge parts (13-14) are made as adjustable parts which make it possible to transform the metalwork (6) from a turn tilt type into a tilt turn type by mutual adjustment.

4. Metalwork according to any one of the preceding claims, **characterised in that** the above-mentioned hinge parts (13-14) for a turn tilt type of metalwork (6) are placed such in relation to one another that

the hinge parts (13-14) are pushed into one another for a first opening position of the control (15), whereas they are pushed out of one another for the second opening position, and that for a tilt turn type of metalwork (6), the hinge parts (13-14) are placed such that, for the first opening position of the control (15), the hinge parts (13-14) are pushed out of one another, and for the second opening position, the hinge parts (13-14) are pushed into one another.

5. Metalwork according to claim 4, **characterised in that** the hinge part (14) can be adjusted between two positions on the fixed frame (2) along an inner edge (41) of the frame (2), corresponding to a position for a turn tilt type of metalwork and a position for a tilt turn type of metalwork respectively, and **in that** the hinge part (13) is provided on the leaf (3) on a slide lath (21-43) which can be shifted over the outer perimeter (8) of the leaf (3) by means of the control (15).

6. Metalwork according to claim 5, **characterised in that** the hinge part (13) on the slide lath (21-43) of the leaf (3) is a hinge pin, whereas the hinge part (14) on the frame (2) is made as a U-shaped element provided on the inner perimeter (41) of the frame (2) with the legs (24) pointing inward and which can be moved over the inner perimeter (41) of the frame (2) between two positions that can be locked, corresponding to a turn tilt or a tilt turn type of metalwork (6) respectively.

7. Metalwork according to claim 6, **characterised in that** the U-shaped element (14) is a U-shaped post whose legs (24) are provided with a recess (25) over a certain length in the central part.

8. Metalwork according to claim 1 and claim 3, **characterised in that**, in order to transform a turn tilt type of metalwork (6) into a tilt turn type of metalwork (6) and vice versa, one only has to adjust one of both coupling elements (37-38) of the locking device of the above-mentioned scissor mechanism (29) and one of both hinge parts (13-14) of the above-mentioned detachable hinge (12) before the tilting.

9. Metalwork according to any one of the preceding claims, **characterised in that** it is provided with a locking mechanism in the form of at least one locking pin (26) in a corner of the window (1), which locking pin (26) can be shifted over the perimeter (8) of the leaf (3) by means of the control (15) between a position whereby, in the closing position of the control (15), the locking pin (26) meshes in a recess (27) of the frame (2), whereas in both opening positions of the control (15), the locking pin (26) is withdrawn from said recess (27) in the frame (2).

10. Metalwork according to claim 9 and claim 3, **characterised in that** one of both hinge parts (13-14) of the detachable hinge (12) for tilting is provided on or is part of the above-mentioned locking pin (26).

11. Metalwork according to any one of the preceding claims, **characterised in that** the control (15) is composed of one or several slide laths (18-21-28-44) which can shift over the outer perimeter (8) of the leaf (3), in a groove in the metalwork (7) in the outer perimeter (8) of the leaf (3), whereby an angle drive (20) is applied in a corner of the leaf (3) which consists of a hooked guide (42) in which an elastic flexible lath (43) can shift, which flexible lath (43) is provided with a coupling piece (44) on its far ends in the shape of a snap-in system for connecting other of the above-mentioned slide laths (18-21-28) or other elements of the metalwork (6) to.

12. Metalwork according to claim 11, **characterised in that** the coupling piece (44) is formed of a holder (45) which is fixed under the flexible lath (43) at a far end concerned and in which has been provided a body (49) which is pushed in the direction of the flexible lath (43) by means of a spring (50) and on which has been provided a protrusion (51) extending through a passage in the flexible lath (43) and protruding over a certain length from the top of the latter when in rest, whereby this protrusion (51) has been designed to co-operate with a passage or a recess (52) of a part of the metalwork (6) to be coupled.

13. Metalwork according to claim 12, **characterised in that** the body (49) is provided with two such protrusions (51) at a distance from one another so as to make it possible for two elements of the metalwork (6) to be simultaneously connected to one and the same far end of the flexible lath (43) of the angle drive (20), should that be necessary.

14. Metalwork according to claim 13, **characterised in that** a slide lath (18-21-28) and an above-mentioned locking pin (26) or hinge part (13) can be simultaneously connected to one and the same far end of the flexible lath (43) of the angle drive (20).

15. Metalwork according to any one of the preceding claims, **characterised in that** the control (15) is provided with a locking mechanism which prevents the control (15) from being moved to the second opening position.

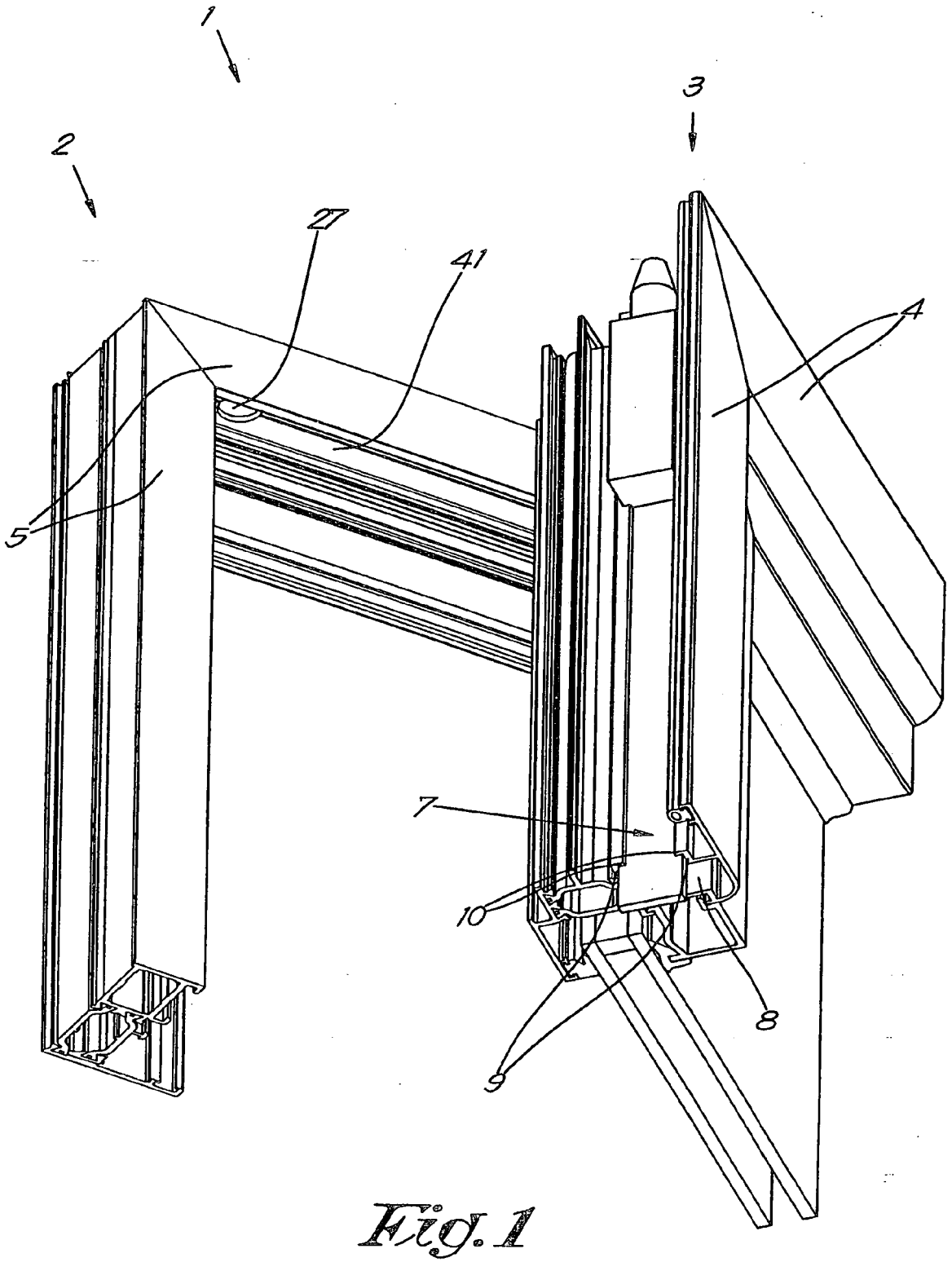

Fig. 1

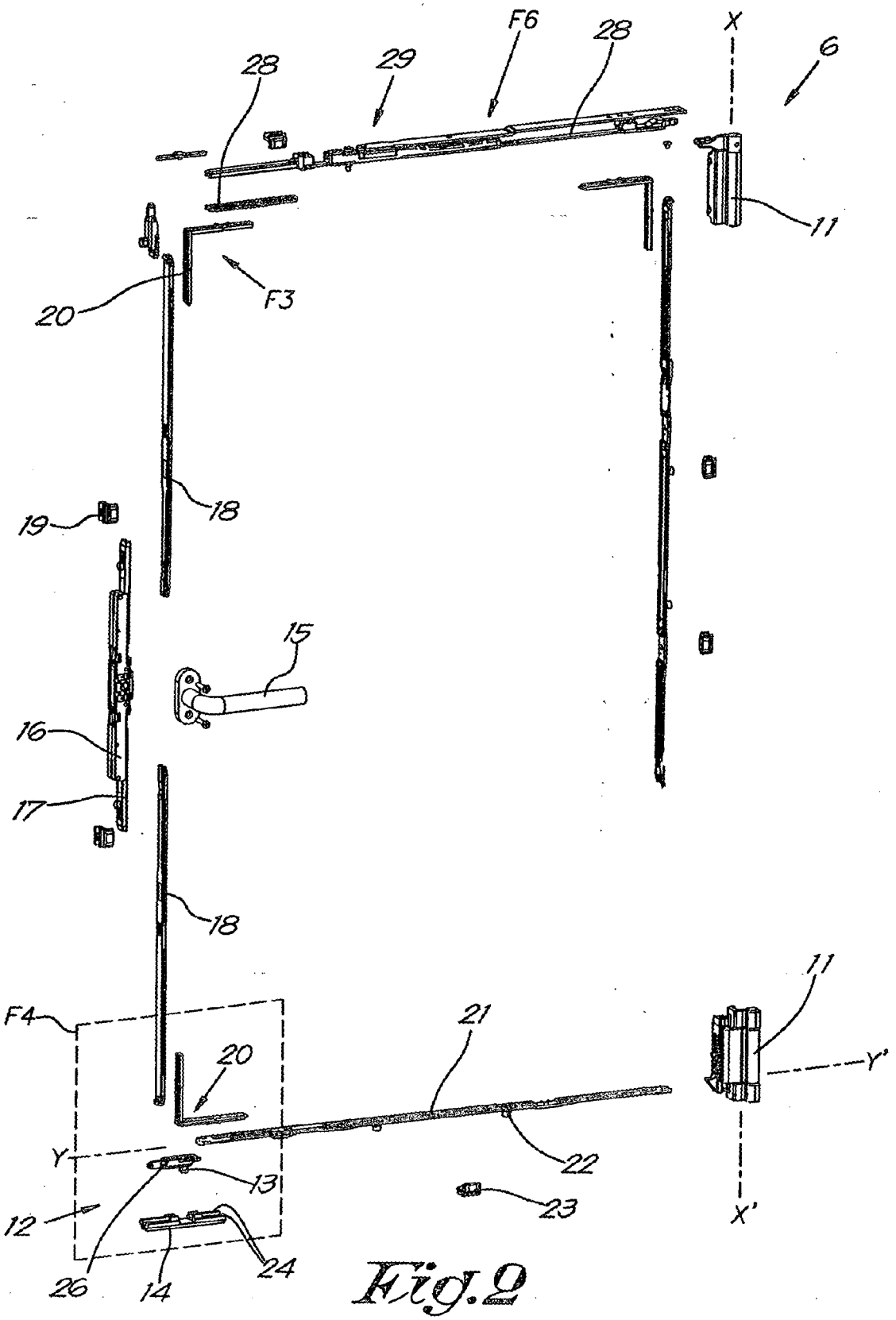
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Fig.2

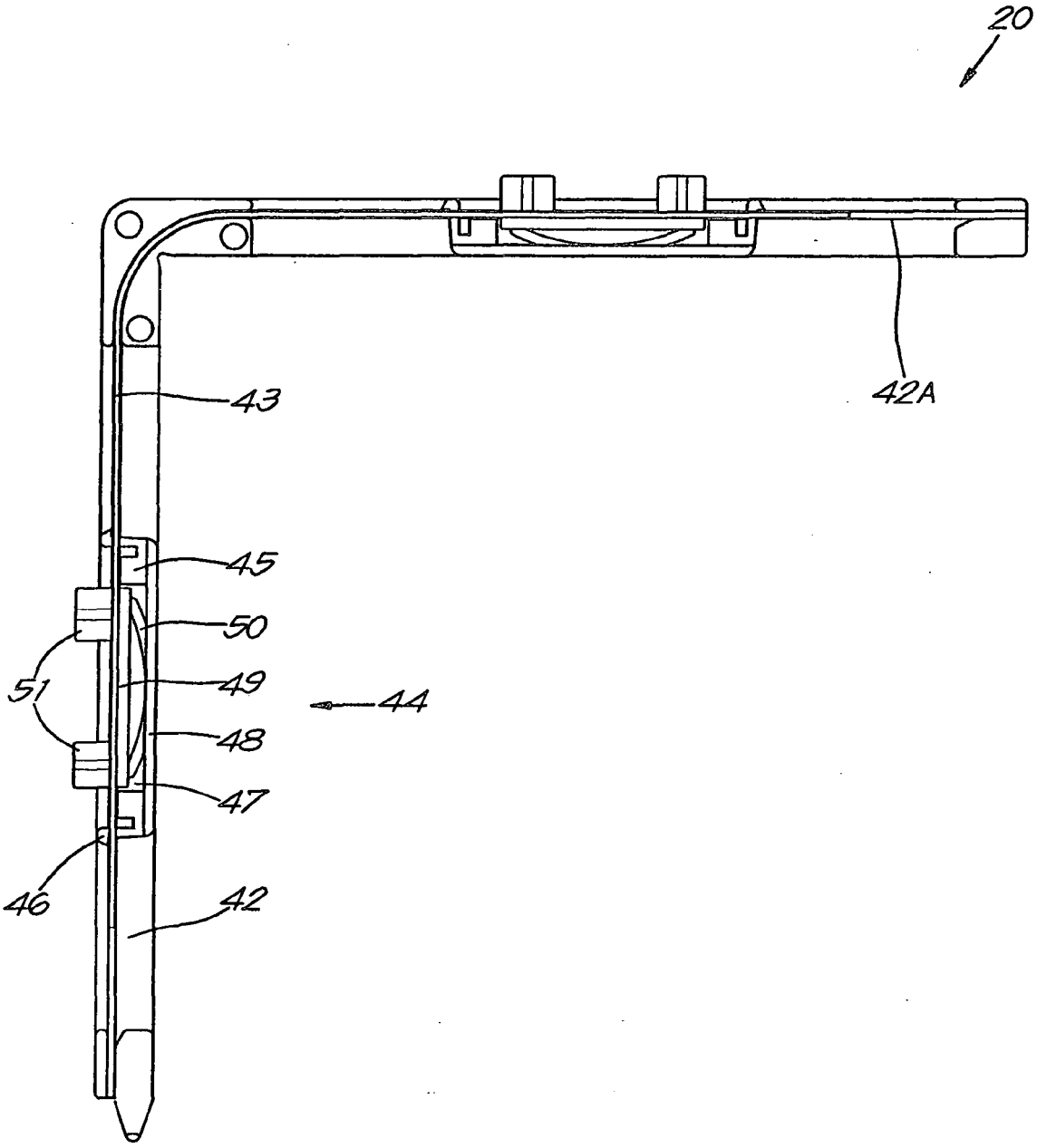

Fig.3

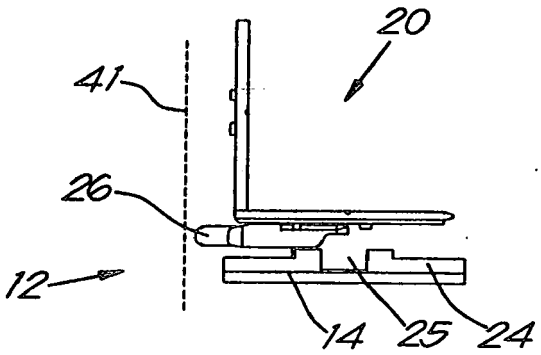

Fig.4

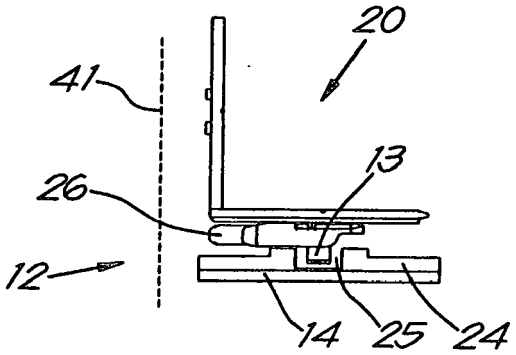

Fig.5

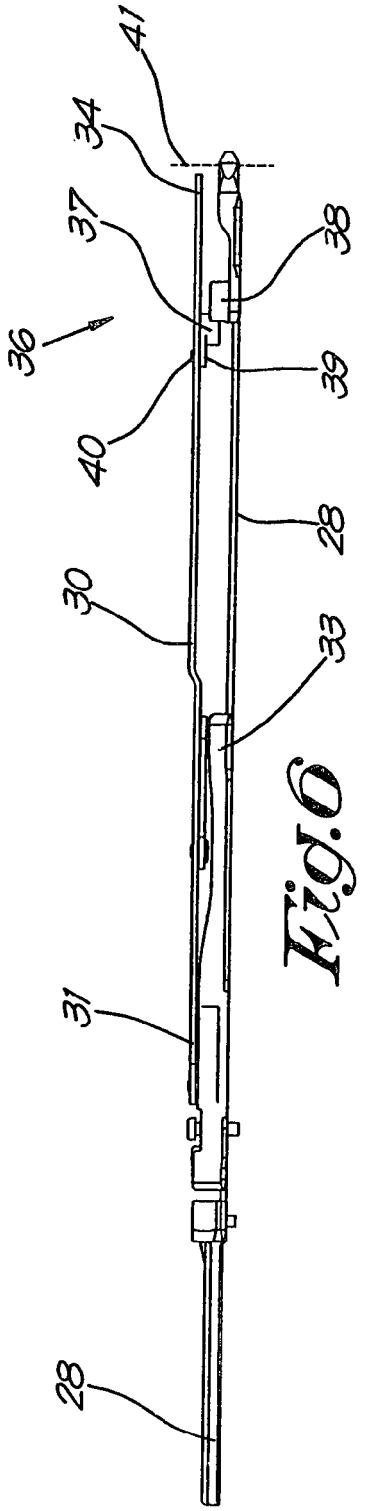

Fig.6

Fig.7

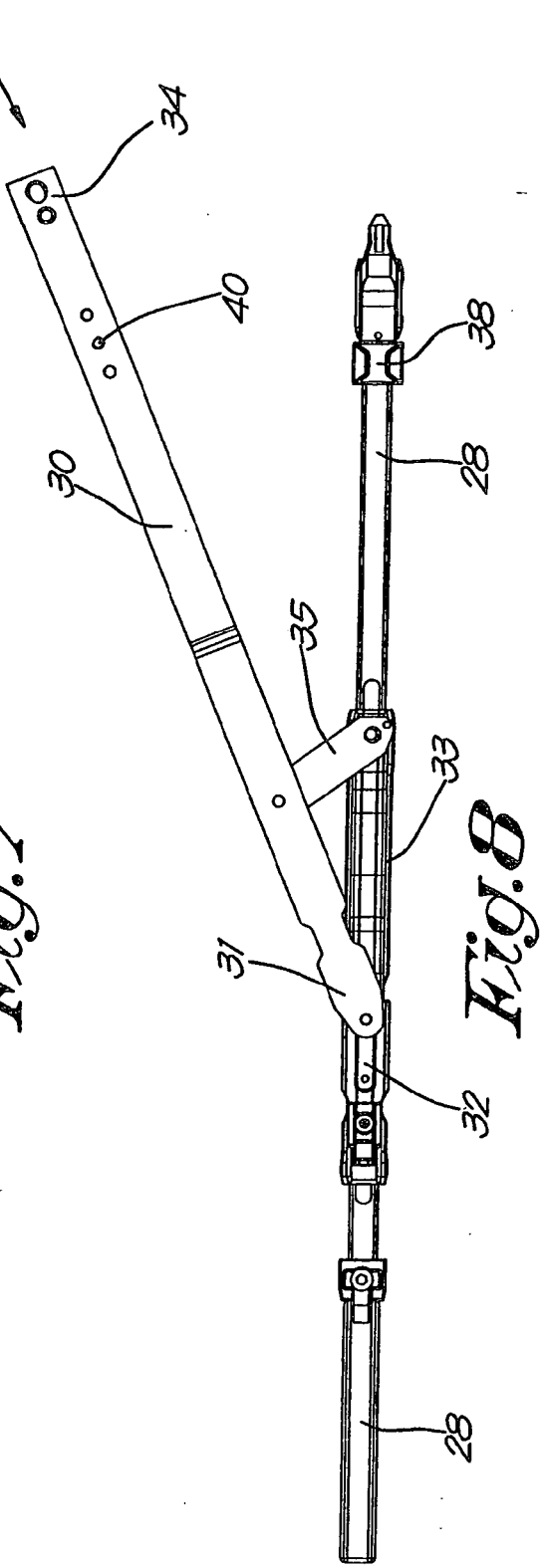

Fig.8

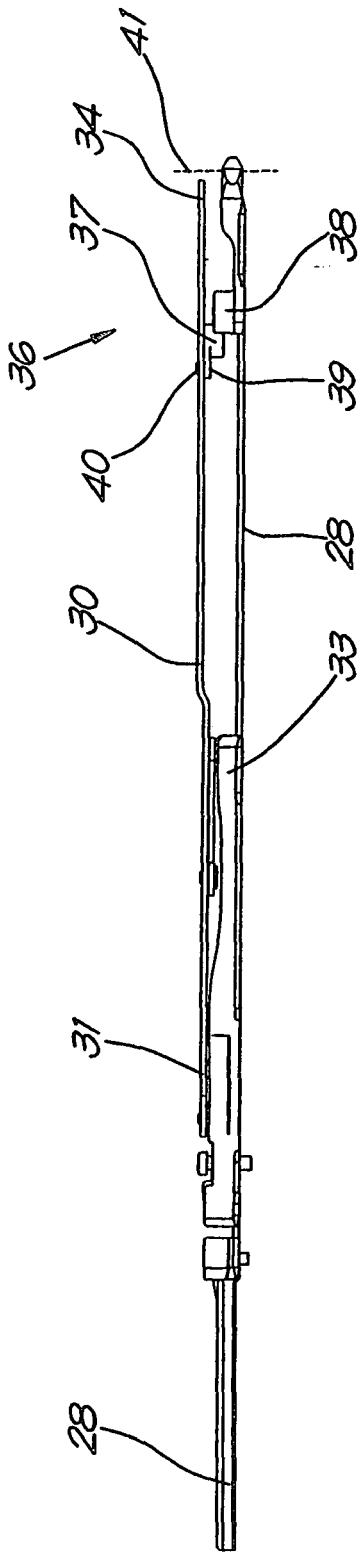

Fig.9A

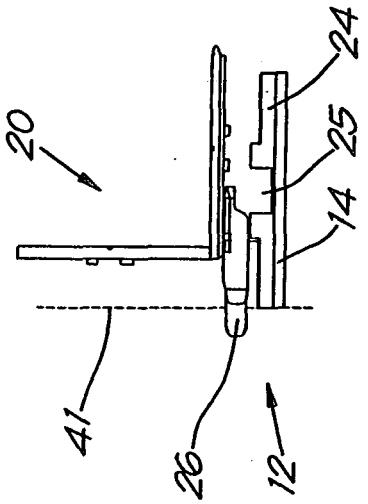

Fig.9B

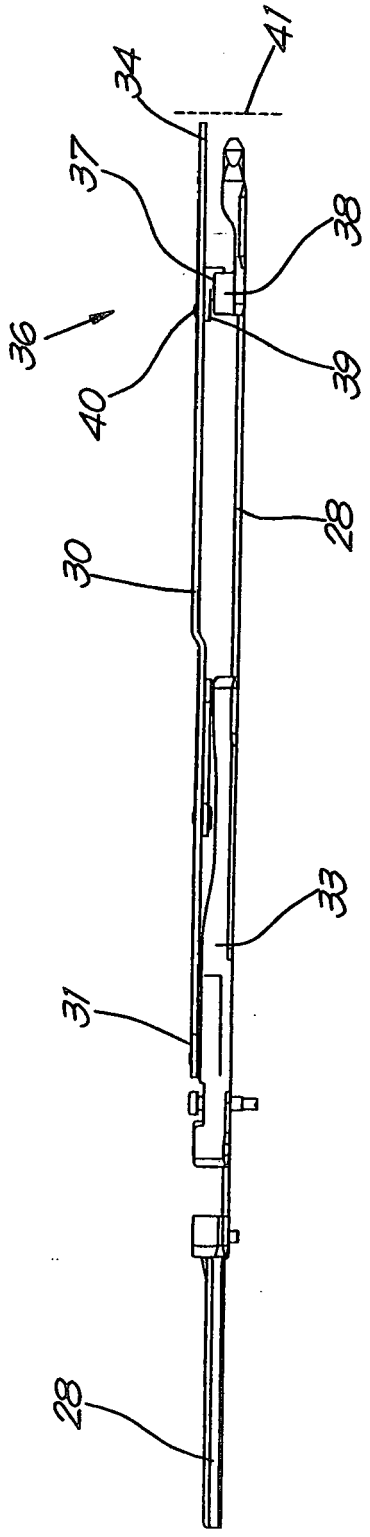

Fig.10A

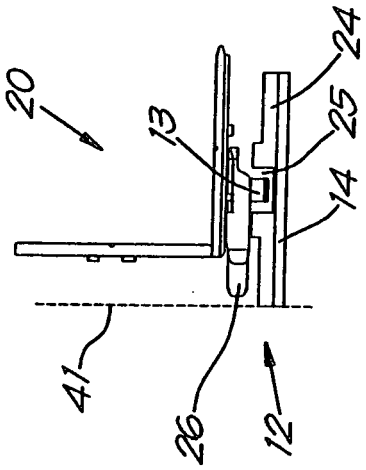

Fig.10B

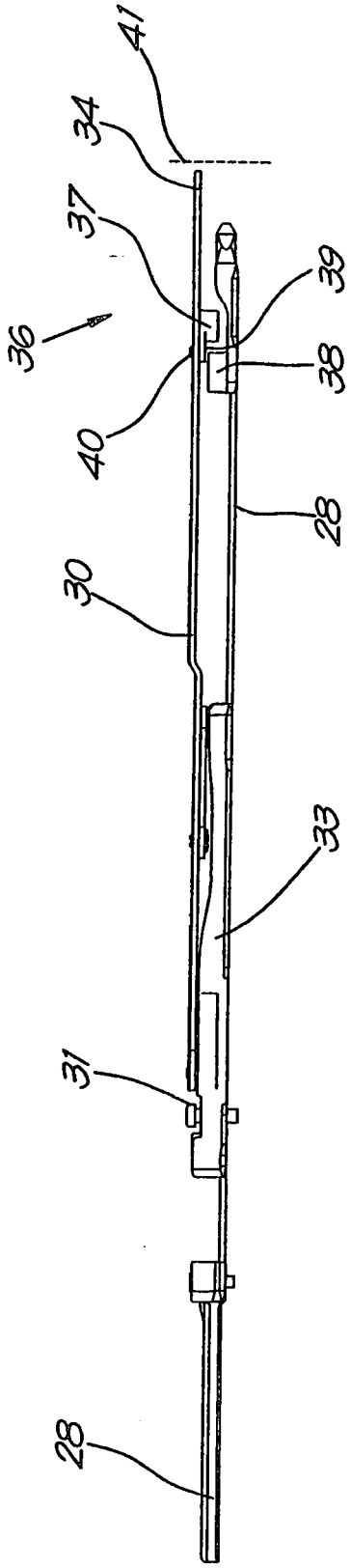

Fig.11A

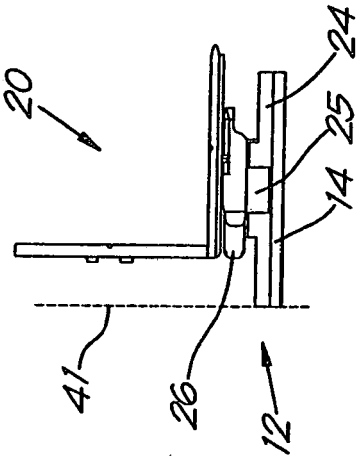

Fig.11B

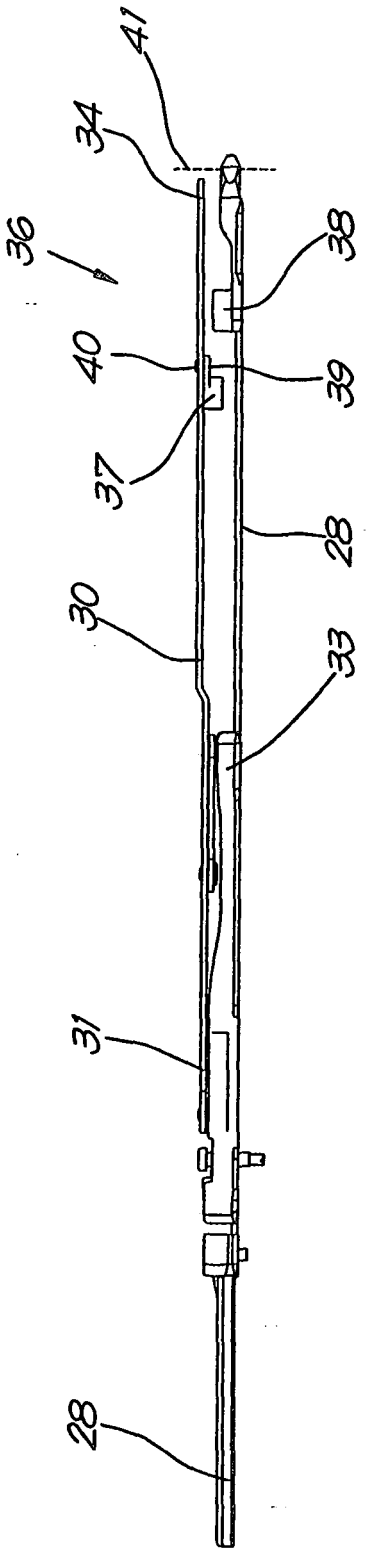

Fig. 12A

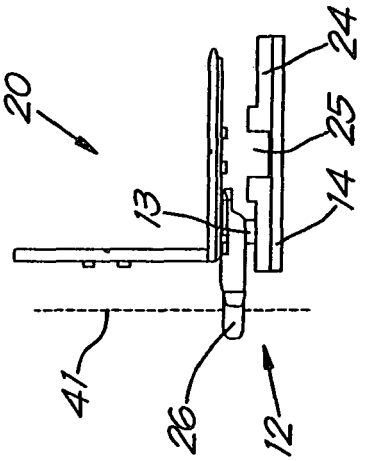

Fig. 12B

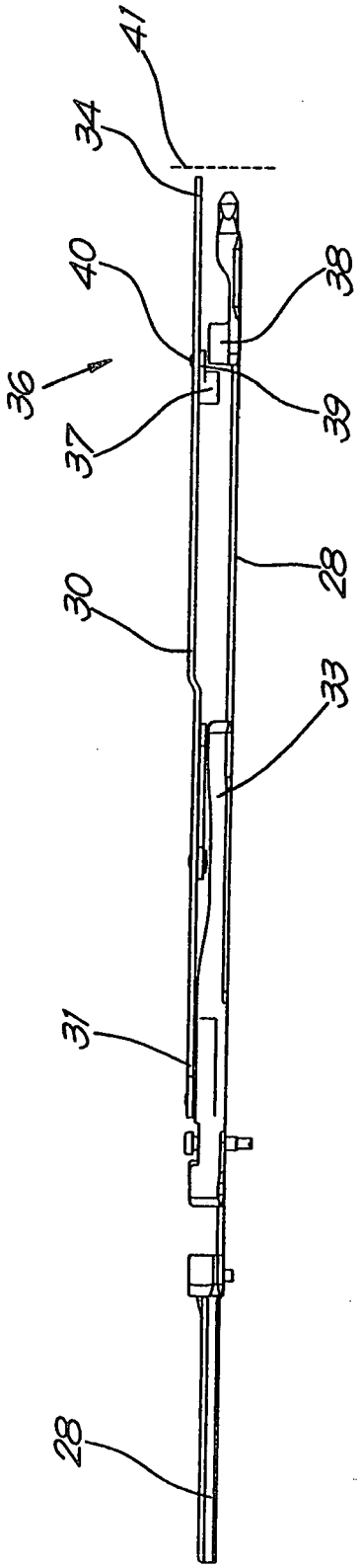

Fig. 13A

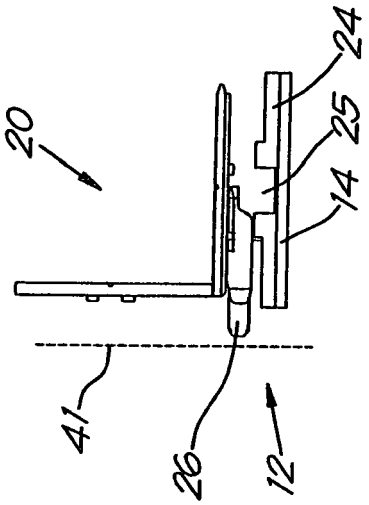

Fig. 13B

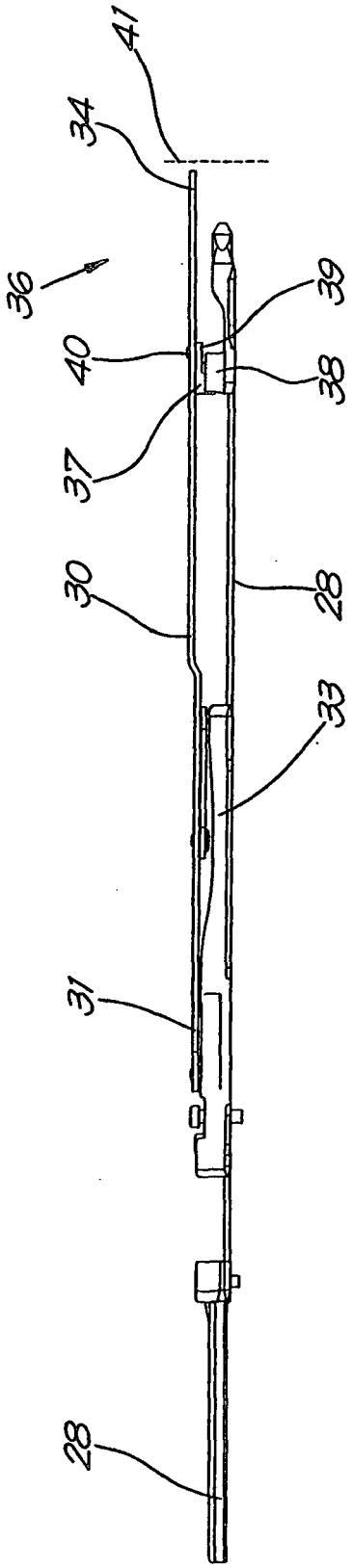

Fig. 14A

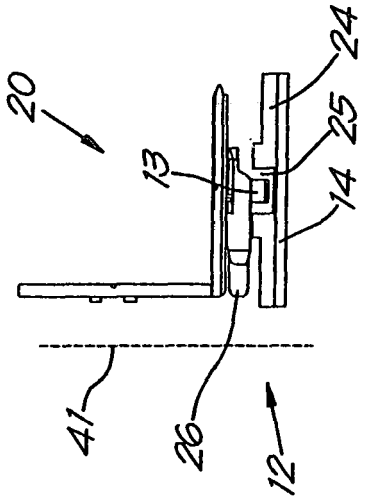

Fig. 14B

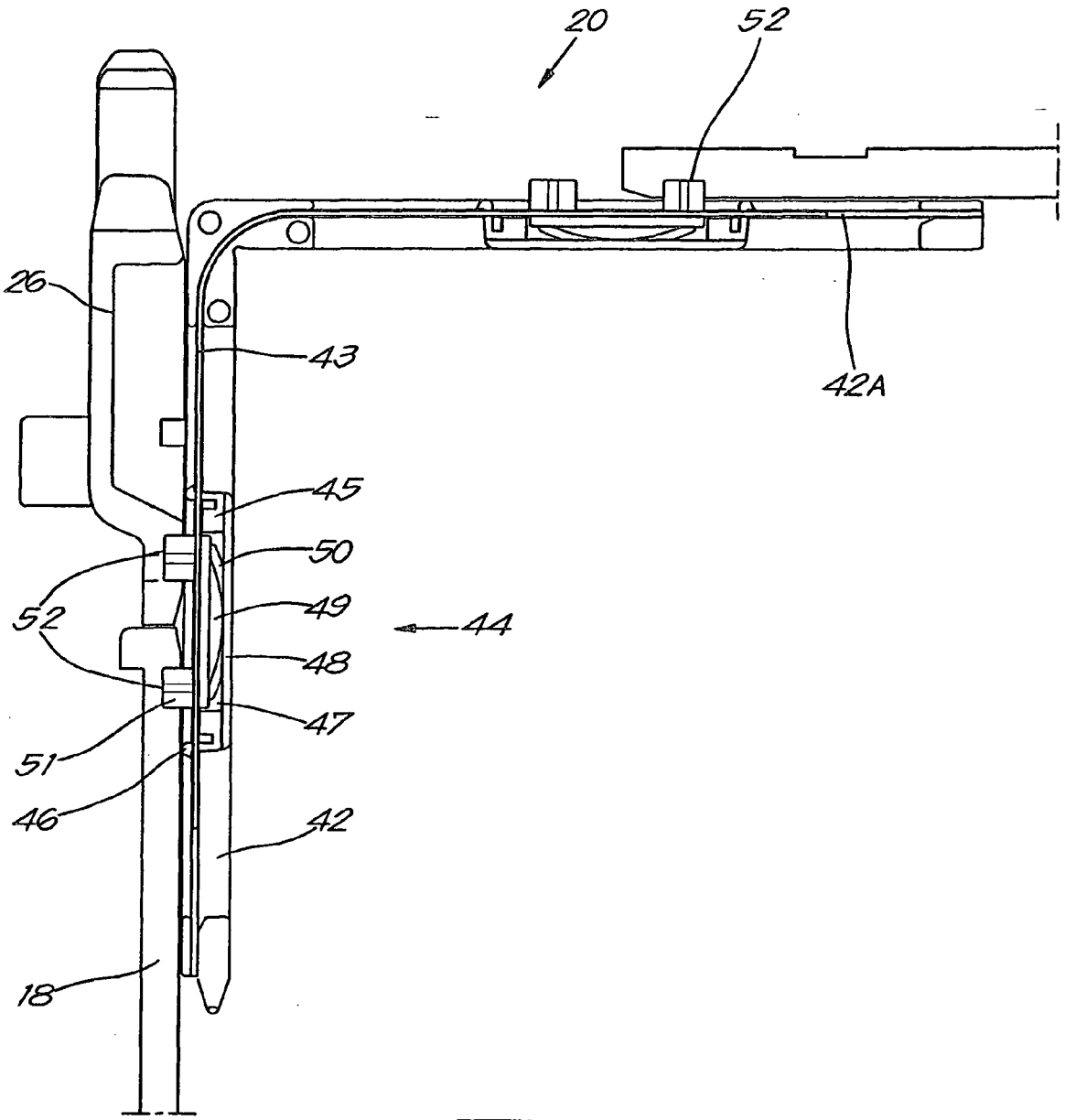

Fig. 15

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EUROPEAN SEARCH REPORT

Application Number
EP 09 00 0274

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	WO 01/94729 A (SIEGENIA FRANK KG [DE]) 13 December 2001 (2001-12-13) * page 1 - page 7 * * figures *	1-8	INV. E05D15/52
A	EP 0 487 466 A (GIESSE SPA [IT]) 27 May 1992 (1992-05-27) * column 2, line 41 - column 5, line 10 * * figures *	1-6,8	
A	DE 196 05 047 A1 (AUBI BAUBESCHLAEGE GMBH [DE]) 5 June 1997 (1997-06-05) * abstract *	3-7	

TECHNICAL FIELDS SEARCHED (IPC)

E05D
E05C
E05B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	9 March 2009	Van Kessel, Jeroen

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09-03-2009

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